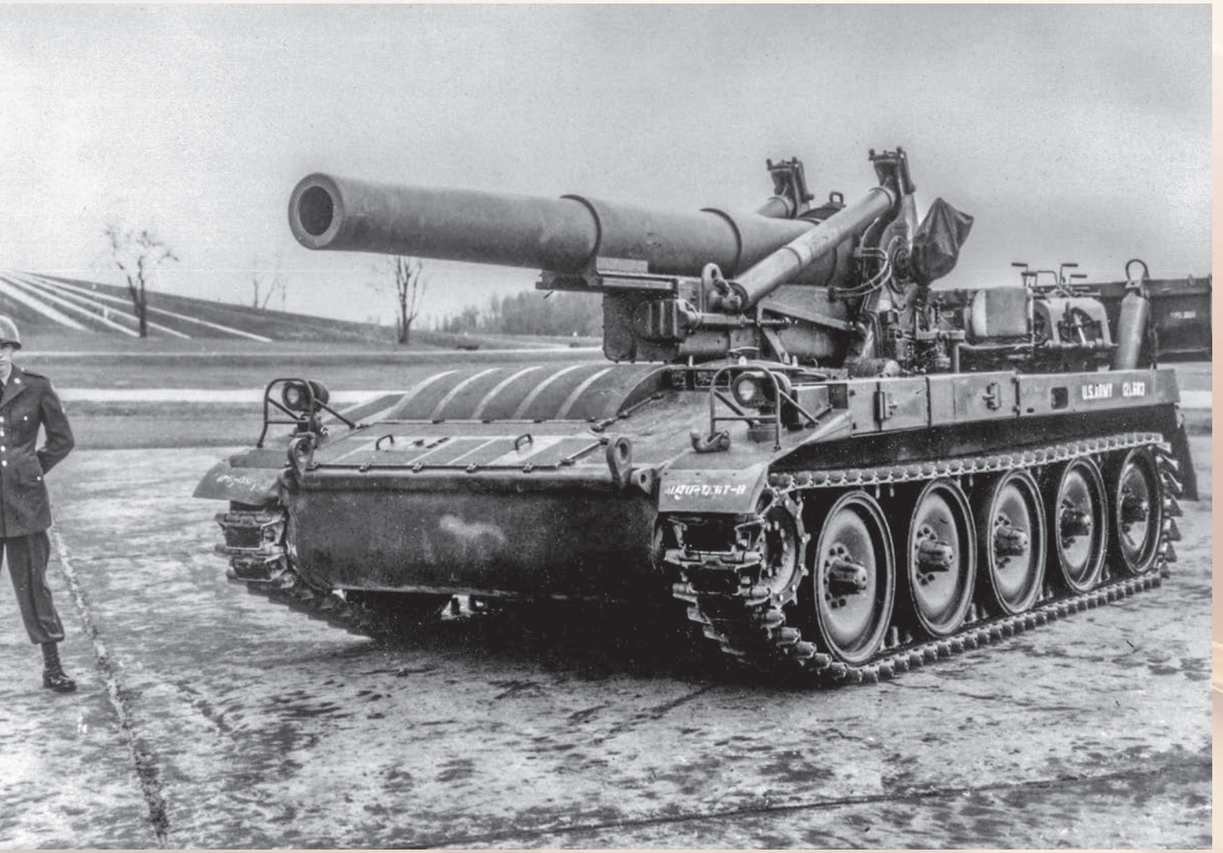
1975 W79 Development

Special-Effect Weapons for the Tactical Battlefield

In January 1975, Livermore was assigned the task of developing a new nuclear artillery shell warhead, the W79, for the U.S. Army's 8-inch howitzers. Nuclear artillery shells were part of the U.S. arsenal from the mid-1950s until 1992. They were deployed for both U.S. Army and U.S. Navy systems and provided a highly accurate, short-range (typically about 10 miles), all-weather capability using delivery systems already deployed with conventional shells.

The W79 and the W70-3 were to be the first battlefield nuclear weapons to include an "enhanced radiation" (ER) capability. ER provided a relatively high fraction of the prompt weapon output in the form of neutrons (hence the nickname "neutron bomb"). ER technology began to be developed at Livermore in the early 1960s and entered the stockpile in 1974 with the deployment of the W66 warhead for the Sprint antiballistic missile interceptor (see Year 1971).



Nuclear artillery shells for the U.S. Army's 8-inch howitzers included an "enhanced radiation" capability developed at Livermore.

ER weapons were also developed for NATO forces. They were designed to be far more effective than previously deployed battlefield nuclear weapons for blunting a Soviet armored invasion of Western Europe and hence strengthened deterrence. A lethal radiation dose to enemy troops—likely protected in armored vehicles—could be achieved with the much smaller yield of an ER weapon than with a standard nuclear weapon. ER weapons could be employed to strike enemy units much closer to urban areas while avoiding collateral damage to towns and civilians.

The W79 weapon development program led to deployment in 1981. In 1976, the Laboratory received a second related assignment—to provide an enhanced radiation modification to the Livermore-designed W70 warhead for the Army's short-range Lance missile system. This warhead, the W70-3, was also deployed in 1981. The W82, a weapon for the 155-millimeter howitzer, was also assigned to Livermore, but the development program was canceled in the mid-1980s prior to deployment.

By the time the W70-3 and the W79 were part of NATO forces, they had become the center of an international controversy. A principal concern expressed by opponents was that by virtue of the lower yield and greater utility of ER weapons, their deployment would serve to lower the threshold for nuclear war. This controversy led to a 1985 Congressional order that future W79s be built without the ER capability, and existing units were modified to remove this capability. Eventually, all U.S. battlefield nuclear weapons were retired in accordance with President George H. W. Bush's September 1991 address to the nation.

Computer models that could accommodate larger numbers and types of military units and were applicable to a wider range of scenarios, such as urban combat, were developed at the Conflict Simulation Laboratory in the 1980s. Player-interactive simulations are used by the U.S. military for training, analysis of tactics, and mission planning.

Conflict Simulation Laboratory

To understand the role of tactical nuclear weapons, analysts have had to take into account many factors that are not amenable to analytical models—the so-called "fog of war." In the mid-1970s, under the leadership of Don Blumenthal, the Laboratory began building high-resolution combat simulation models. A major advance occurred in 1978, when George Smith developed Mini-J, the first two-sided, player-interactive combat simulation model. The players observed their own units in real time, interactively acquired enemy units on a computer screen, and gave orders. Mini-J evolved into a model called Janus, which was successively improved at Livermore's Conflict Simulation Laboratory. The culmination of this work is the Joint Conflict and Tactical Simulation (JCATS) model, which is widely used by the Department of Defense, Secret Service, and other agencies for training and planning.